R E P O R T R E S U M E S

ED 010 769 SE 000 060

THE STATUS OF SCIENCE IN THE PUBLIC SCHOOLS OF IOWA. PART II, JUNIOR HIGH SCHOOL.

BY- PORTER, T.R. AND OTHERS
IOWA UNIV., IOWA CITY

REPORT NUMBER 1660-87DPE PUB DATE 65
IOWA STATE DEPT. PUBLIC INSTR., DES MOINES
EDRS PRICE MF-$0.09 HC-$1.72 43P.

DESCRIPTORS- *CURRICULUM DEVELOPMENT, *COURSE CONTENT, *EVALUATION, *SECONDARY SCHOOL SCIENCE, BIOLOGY, GENERAL SCIENCE, GRADE 7, GRADE 8, GRADE 9, INSERVICE TEACHER EDUCATION, PHYSICAL SCIENCES, TEACHER QUALIFICATIONS, TEACHING PROCEDURES, IOWA CITY, DES MOINES

INFORMATION WAS COLLECTED BY QUESTIONNAIRE FROM SCIENCE SUPERVISORS AND SCIENCE TEACHERS IN 51 SCHOOLS THROUGHOUT IOWA TO DETERMINE THE STATUS OF SCIENCE PROGRAMS IN IOWA JUNIOR HIGH SCHOOLS. EQUAL NUMBERS OF SMALL-, MEDIUM-, AND LARGE-SIZED SCHOOLS WERE SELECTED. DATA COLLECTED AND ANALYZED INCLUDED (1) THE AVAILABILITY OF EQUIPMENT, SUPPLIES, BOOKS, AND VISUAL AIDS, (2) CURRICULUM DEVELOPMENT ACTIVITIES, (3) PRESENCE OF SCIENCE SUPERVISORS AND INSERVICE TRAINING PROGRAMS, (4) CLASSROOM TEACHING PRACTICES IN USE, (5) TEACHER QUALIFICATIONS. AND (6) COURSE CONTENT. SIMILAR REPORTS HAVE BEEN RELEASED ON THE STATUS OF SCIENCE IN THE ELEMENTARY SCHOOLS AND IN THE SENIOR HIGH SCHOOLS IN IOWA. (RS)

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

NOV 2 1 1966

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

The Status of Science in the Public Schools of Iowa

Part II - JUNIOR HIGH SCHOOL

T. R. PORTER
Associate Professor and Head, Science Education
State University of Iowa
Iowa City, Iowa

JOSEPH J. SNOBLE
Instructor, Science Education
State University of Iowa
Iowa City, Iowa

ARTHUR C. ANDERSON
Consultant, Planning and Development
State Department of Public Instruction
Des Moines, Iowa

ED010769

STATE UNIVERSITY OF IOWA

IOWA STATE DEPARTMENT OF PUBLIC INSTRUCTION

1965

TABLE OF CONTENTS

INTRODUCTION 1

SECTION I: SUPERVISORS' EVALUATION. 2

A. Curriculum in General 2
B. Other Characteristics 3

SECTION II: TEACHERS' EVALUATION 4

A. Curriculum in General 4
B. Other Characteristics 5

SECTION III: COURSE CONTENT. 8

SECTION IV: CONCLUSIONS 9

SECTION V: RECOMMENDATIONS 9

APPENDIXES 11

A. Schools Selected for Science Survey 13
B. School Personnel Collecting Data For This Study 17
C. Data Collected From Supervisors 21

Table C-1. Supervisors' evaluation of school curriculum. 23
Table C-2. Supervisors' statements concerning state curriculum . . 24
Table C-3. Status of equipment and supplies. 25
Table C-4. Status of programs for the improvement of science . . . 26
Table C-5. Status of texts and other reference materials 27
Table C-6. Numbers of schools ranking classroom methods used . . . 28
Table C-7. Numbers of schools ranking visual aids used 29
Table C-8. Minutes per week for school allotted for science. . . . 30

D. Data Collected From Teachers. 31

Table D-1. Teachers' evaluation of school curriculum 33
Table D-2. Teachers' statements concerning state curriculum. . . . 34
Table D-3. Status of departmentalization 35
Table D-4. Status of equipment and supplies. 36
Table D-5. Status of programs for the improvement of science . . . 37
Table D-6. Minutes per week taught in science. 38
Table D-7. Status of texts and reference books 39
Table D-8. Numbers of teachers ranking classroom methods used. . . 40
Table D-9. Numbers of teachers ranking visual aids used. 41
Table D-10. Numbers of teachers holding particular degrees. 42
Table D-11. Semester hours of credit completed by teachers in specific subject matter areas 43
Table D-12. Total number of years of teacher experience and years of teaching science 43

Graph Relative frequency of major subject topic emphasis in junior high science 44

STATUS OF SCIENCE IN THE JUNIOR HIGH SCHOOLS OF IOWA

Introduction

This report is based on a study undertaken in May, 1963. The principal purposes of the study are:

1) Ascertaining the status of present science curricula in the junior high schools of Iowa.

2) Cataloguing this information.

A comparison of this information will be made with similar data collected late in 1965. The purpose of this comparison will be to measure the impact of the new state science curriculum, Science for Iowa Schools, for the junior high school science programs in the public schools of Iowa. In addition to this report, a similar one will follow which will describe the current status of science as it existed in May, 1963, in the senior high schools of this state.[1]

The information summarized in this paper was collected from fifty-one school systems.[2] All of these schools were chosen at random by the Iowa Department of Public Instruction on the basis of geographical location and enrollment of High School District. Thus, the schools chosen were as representative as possible of all Iowa Schools.

A group of seventeen of these schools had High School District enrollments of 600 or more students. This group of schools is designated as "Group I", or "larger" schools. The second group of seventeen schools had a High School District enrollment of 300-599 students and is designated as "Group II", or "medium-sized", schools. The third group of seventeen schools had a High School District enrollment of 0-299 students and is designated as "Group III", or "small", schools. The information contained herein was gathered by a science teacher or administrator from each of the seventeen medium-sized

---

1 A report on the status of elementary school science has already been issued and is available from the Iowa Department of Public Instruction. (See footnote 1, page 4.)

2 See Appendix A for list of participating schools and their geographical distribution.

High School Districts (300-599 students).[1] These people administered the questionnaires to their own schools first and then each to a smaller and larger school.[2]

One supervisor for each junior high school filled out a questionnaire. Also, the two or three teachers in each junior high school filled out similar questionnaires. In addition, the supervisors and/or teachers completed a third form (basically a checklist) which furnished information concerning curriculum offerings by topic and emphasis. All of the above-mentioned information was then compiled by I.B.M. computers into a more condensed form from which tables and graphs were prepared. The following summarizes as objectively as possible the information disclosed by these tables and graphs.[3]

SECTION I: SUPERVISORS' EVALUATION

RESUMÉ OF JUNIOR HIGH SCHOOL SUPERVISORS' REPORTS

A. Curriculum in General

Slightly less than two-thirds of the junior high schools participating in this study had a planned science curriculum. Twenty-four schools of the twenty-six reporting prepared their curricula between the years 1958 and 1963, but none were prepared in 1959. The peak year for curriculum revision was 1962. Little or nothing was done in the way of curriculum planning prior to 1960.

The majority of the planned curricula, or 17, was prepared by teacher groups alone while the remaining curricula, or 9, were planned jointly by teachers and administrators. For those schools reporting no planned curriculum (i.e. 20 schools) nearly three-fourths (or 14 schools) indicated they were preparing to develop one. The remaining six schools reported no plans for science curriculum development.

It must be noted here that the number of junior high schools will vary as reported. This is because in some districts grades seven and eight are included as a part of the elementary school; in other districts they are a part of a junior-senior high

---

1 See Appendix A

2 See Appendix B for list of school personnel gathering data for this project.

3 See Appendix C for data collected from supervisors.

school.

About two-thirds (69.1%) of the administrators and slightly more than one-half (55.3%) of the teachers knew about the new state science curriculum. Eight out of every ten schools planned to use this curriculum as soon as available. Almost all the schools reporting (93.5%) planned to use the new curriculum only as a pattern.

B. Other Characteristics

1. General

a. Nine out of ten supervisors rated availability of equipment as good to excellent.

b. Forty-four out of forty-five supervisors rated supplies "good to "excellent" (three to five on a five point rating scale).

c. A majority of the schools reporting did not have science or mathematics consultants. Four of forty-three schools had a science consultant, two schools had a consultant in mathematics, and five had a joint science-mathematics consultant.

d. Few schools had conducted science workshops or in-service courses. Of those conducted, all were reported by Group I Schools (larger High School District) and Group II Schools (medium-size High School District).

e. Science fairs were not common. The majority were held by Group I and II schools and took place in 1962 and 1963 (data gathered in May, 1963).

2. Books (texts, special reference) and Periodicals

a. The single text approach was used by most schools (80.0%).

b. Thirty-six supervisors rated their textbooks as "good" or "very good". Only four rated them as "excellent" and six rated them as "poor" or "very poor".

c. Most supervisors rated their reference books and periodicals as "good" and "very good".

3. Classroom Methods

a. Text reading followed by discussion was the most frequently used method of teaching science in all schools regardless of size.

b. The next most frequent methods of instruction were teacher demonstrations, pupil demonstrations, and pupil experiments (in this order).

c. Research reading, directed observations, outdoor education, field trips and excursions, and use of resource people were used less frequently.

The above classroom methods are not significantly different from those reported earlier for the elementary grades.[1]

4. Visual Aids

a. Films and filmstrips were the most frequently used visual aids in all schools reporting.[2]

b. Bulletin boards, charts, and dioramas were used next most frequently.

c. Models and live materials (in this order) were used the least frequently.

SECTION II: TEACHER EVALUATION

RESUME OF JUNIOR HIGH SCHOOL TEACHERS' REPORTS

A. Curriculum in General

Two-thirds (66.4%) of the teachers reported planned curricula in their schools. Approximately six out of every ten were developed by teacher groups while the remainder of the curricula were developed by teacher-administrator groups. The peak year for curriculum development as reported by the teachers was in 1962 when over 34% did so. In no other year[3] did curriculum development exceed one-half of

---

1 The Status of Science in the Public Schools of Iowa, Part I - Elementary School, Department of Public Instruction, Bulletin # 12640-1110IRP, 1964.

2 Bulletin boards were most frequently used at the elementary school level.

3 Survey was taken in the spring of 1963, so the report for that year was not complete.

this total (i.e., 17% of tne total) and no curricula were devloped before 1958 by the reporting schools. Plans to do so were indicated by approximately two-thirds of the schools who had not already developed a curriculum.

Nearly two-thirds (65.6%) of the teachers indicated they knew about the new state science curriculum and a like amount (63.1%) indicated they planned to use it. Practically all of those who planned to use it (94.2%) indicated it would serve as a pattern for their school curriculum development in favor of adopting it "as is."

B. Other Characteristics

Teachers provided the following information:

1. Departmentalization

   a. Over three-fourths (76.7%) of the reporting junior high school teachers stated their schools were departmentalized, thus leaving one-fourth that were not. This was exactly the opposite reported earlier by elementary school teachers.[1]

   b. A slightly greater percentage (81.0%) of the schools reported departmentalization in subject matter areas other than science.

   c. A very large percentage (91.3%) of the schools had special rooms for science. This was again exactly the reverse of what was true for the elementary school (as reported by the elementary school teachers)[2] where only 9.9% reported having special rooms.

2. Availability of Equipment and Supplies

   a. Approximately one out of every five (18.7%) of the teachers reported availability of equipment in their schools as "excellent". One out of

---

1 The Status of Science in the Public Schools of Iowa, Part 1 - Elementary School, Department of Public Instruction, Bulletin # 12640-1110IRP, 1964.

2 Ibid.

every three of the remaining teachers rated this category as "very good" (35.9% of the total teachers) and "good" (38.3% of the total teachers) respectively. No more than 7% of the teachers reported equipment availability as "poor or "very poor".

b. A slightly higher percentage (19.5%) of the teachers rated availability of supplies as "excellent" while 34.4% and 40.6% rated this category as "very good" and "good" respectively. Only 5.5% rated supplies availability as "poor" while none rated this "very poor".

3. Science Consultants

Nearly nine of every ten schools had neither a science nor a science-mathematics consultant. The vast majority of schools reporting they had consultants were the "large" schools.

4. Teacher Improvement

a. Approximately one of four (24.2%) teachers reported their schools had conducted science workshops. Nearly double this (43.2%) of the elementary school teachers[1] reported science workshops had been conducted in their schools.

b. A much smaller percentage (5.5%) of the schools conducted in-service science courses. This contrasted to 16% in the elementary school.[2]

5. Science Fairs

Over one-half (58.1%) had conducted science fairs in contrast to less than 50% for the elementary schools.[3]

6. Time Allotment

The mean time per week per teacher spent in teaching science ranged from 647 minutes in the "small" schools to 1135 minutes in the "large" schools.

---

1 The Status of Science in the Public Schools of Iowa, Part I - Elementary School, Department of Public Instruction, Bulletin #12640-1110IRP, 1964.

2 Ibid.

3. Ibid.

7. Books (texts, special reference) and Periodicals

   a. The single text approach was used by 79 of the 86 teachers reporting.

   b. The majority of the teachers reported their text and reference books were "very good" or "good". (See Table D-7 in Appendix)

8. Classroom Methods

   a. Text reading and discussion followed by teacher demonstrations were the most frequently reported classroom methods.

   b. Pupil demonstrations, pupil experiments, and directed observations were the next most frequently reported.

   c. The use of resource people, research reading, and field trips followed in this order.

9. Visual Aids

   a. Filmstrips were the most frequently used visual aid.

   b. Films, charts, and bulletin boards were the next most frequently used visual aids.

   c. Dioramas, live materials, and models were used in this order.

10. Teacher Background

   a. There were more teachers with degrees in the larger schools than either of the other two sized schools.

   b. There were considerably more teachers with advanced degrees on the staffs of the larger schools.

   c. The greatest number of hours in all science areas have been earned by the teachers in the large schools.

   d. The majority of the teachers[1] had less than twenty hours of work in all science areas.

---

1 See Table D-(E)-11 in Appendix

e. Fewer teachers had taken course work in meteorology and astronomy than in any other subject area.

f. In all cases, the teachers had more years of general teaching experience than years of teaching science.

g. In the Group I schools (larger schools) there was a tendency for the teachers to have more teaching experience than in the schools of either Group II or Group III. This is also true for the years experience teaching science.

SECTION III: COURSE CONTENT

There were ten major topics included on the course content information sheet for grades seven, eight, and nine. Each of these topics was divided into those sub-topics necessary to describe the program. These were as follows:

Topic	No. of Sub-Topics
Matter	21
Plants and Animals	31
Geology	30
Meteorology	26
Astronomy	42
Human Physiology	28
Energy	25
Electricity	19
Mechanics	10
Measurement	5

Any one of these ten major topics was considered to be strongly emphasized in a given grade if 50% or more of its sub-topics were strongly emphasized.

More of the ten major topics were strongly emphasized at the ninth grade and the fewest at the seventh grade level.

The physical science topics mechanics, matter, and electricity received the greatest emphasis and this was placed at the ninth grade level. Biological topics and meteorology received the second most emphasis with nearly equal concentration in every grade.

The two other physical science topics, energy and measurement, were strongly emphasized at the ninth grade level, but with much less concentration. The least emphasized topics were astronomy and geology in this order.

This pattern of concentration is to be expected because more teachers have had their preparation in the biological and physical sciences than in astronomy or geology. See graph at the end of Appendix D.

SECTION IV: CONCLUSIONS

1. Too many different major topics are taught at the ninth grade level if there is to be any depth in the content.
2. Science offerings for grades seven and eight lack depth and continuity.
3. Science is emphasized less at the seventh grade.
4. Approximately 10% of the teachers have any formal training in astronomy or meteorology.
5. Measurement is most frequently taught at the ninth grade.
6. There are too many schools without planned science curricula.
7. Use of science consultants and available in-service programs are too infrequent.

SECTION V: RECOMMENDATIONS

1. Schools should examine and evaluate their junior high school science offerings. It is possible that some of the ninth-grade science content should be included in grades seven and eight.

2. Schools should make provisions to emphasize science at the seventh grade level.
3. Since astronomy, geology, and meteorology will be emphasized more in the state curriculum, in-service programs in these areas are needed.
4. The concepts of measurement and their applications to science should be taught prior to junior high school.
5. Every school should have a planned science curriculum available to all of its teachers.
6. There should be a greater variety of teaching methods used in science.
7. Science consultants should be used more frequently because of the rapid increase in scientific knowledge and its complexity. More in-service programs should be conducted for the same reasons.
8. Present science course requirements for certification at the junior high school level should be evaluated and possibly modified to provide the teacher with a more adaquate content background and teaching method for the new science curriculum.

A P P E N D I X E S

A. SCHOOLS SELECTED FOR SCIENCE SURVEY

B. SCHOOL PERSONNEL COLLECTING DATA FOR THIS STUDY

C. DATA COLLECTED FROM SUPERVISORS

D. DATA COLLECTED FROM TEACHERS

PRECEDING PAGE BLANK-NOT FILMED

APPENDIX A

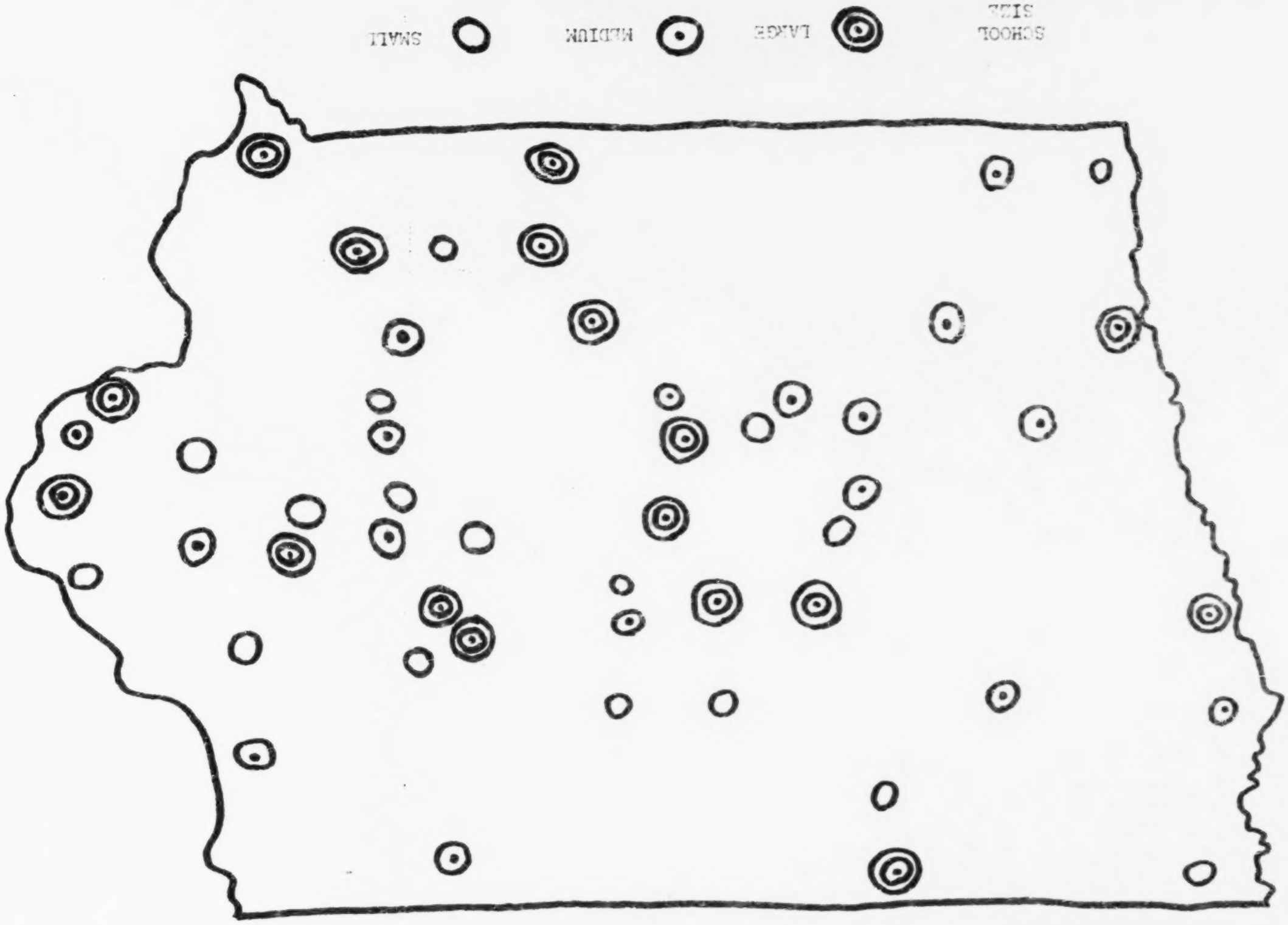
SCHOOLS SELECTED FOR SCIENCE SURVEY

PRECEDING PAGE BLANK-NOT FILMED

APPENDIX A

SCHOOLS SELECTED FOR SCIENCE SURVEY

	Name of District	County	High School Enrollment	
Large Schools	Des Moines	Polk	10,775	600 +
	Cedar Rapids	Linn	4,868	
	Davenport	Scott	4,665	
	Waterloo	Black Hawk	4,202	
	Sioux City	Woodbury	3,894	
	Council Bluffs	Pottawattamie	3,537	
	Fort Dodge	Webster	1,818	
	Clinton	Clinton	1,728	
	Ames	Story	1,321	
	Cedar Falls	Black Hawk	1,185	
	Keokuk	Lee	1,031	
	Fairfield	Jefferson	887	
	Webster City	Hamilton	822	
	Centerville	Appanoose	687	
	Esterville	Emmet	664	
	Albia	Monroe	655	
	Knoxville	Marion	645	
Medium Schools	Le Mars	Plymouth	571	300 - 599
	North Scott	Scott	557	
	Iowa Falls	Hardin	533	
	Perry	Dallas	519	
	Storm Lake	Buena Vista	499	
	Jefferson	Greene	474	
	Clarinda	Page	446	
	Vinton	Benton	426	
	Monticello	Jones	403	
	Harlan	Shelby	390	
	Johnston Cons	Polk	368	
	Griswold	Cass	347	
	Williamsburg	Iowa	338	
	Central Comm	Clayton	335	
	Sigourney	Keokuk	322	
	Guthrie Center	Guthrie	313	
	Riceville	Howard	307	
Small Schools	West Lyon	Lyon	265	0 - 299
	Traer-Clutier	Tama	250	
	Edgewood-Colesburg	Delaware	237	
	H L V	Iowa	223	
	Eddyville	Wapello	210	
	CAL	Franklin	195	
	Dunkerton	Black Hawk	186	
	Lincoln Comm	Cedar	177	
	Farragut	Fremont	170	
	Churdan	Greene	161	
	Alden	Hardin	152	
	Norway	Benton	142	
	Lisbon	Linn	134	
	Woodward	Dallas	124	
	Ruthven	Palo Alto	118	
	Miles	Jackson	107	
	Goldfield	Wright	101	



SCHOOLS SELECTED FOR SCIENCE SURVEY
TO SHOW GEOGRAPHICAL DISTRIBUTION

APPENDIX B

SCHOOL PERSONNEL COLLECTING DATA FOR THIS STUDY

PRECEDING PAGE BLANK-NOT FILMED

APPENDIX B

SCHOOL PERSONNEL COLLECTING DATA FOR THIS STUDY

1. Richard Peterson - Le Mars - Physics Instructor
2. Melvin E. Heiler - North Scott - Junior and Senior High Principal
3. Kenneth Harfst - Iowa Falls - Science Instructor
4. Thomas Drake - Perry - Junior High Principal
5. Richard Kearney - Storm Lake - Chemistry Instructor
6. Anthony A. Andrusyk - Jefferson - Biology Instructor
7. Jerald Blasi - Clarinda - Senior High Principal
8. Donald DeFrenger - Vinton - Chemistry Instructor
9. Dale Greenawald - Monticello - Junior and Senior High Principal
10. Glen Kuiper - Harlan - Chemistry and General Science Instructor
11. Richard Seveeney - Johnston - Chemistry and Biology Instructor
12. V. A. Chadwick - Griswold - Senior High Principal
13. Roland Chapman - Williamsburg - Biology Instructor
14. Harold Ebel - Central - Senior High Principal
15. Harrison Seip - Sigourney - Head, Science Department
16. Ted K. Hansen - Guthrie Center - Elementary Principal
17. Dale C. Guldberg - Riceville - Senior High Principal

PRECEDING PAGE BLANK-NOT FILMED

APPENDIX C

DATA COLLECTED FROM SUPERVISORS

Schools by Size	Planned Curriculum		Date Curriculum Planned							Curriculum Prepared By		Plans for Curriculum Development	
	Yes	No	Before 58	58	59	60	61	62	63	Teacher	Teacher and Administrator	Yes	No
Large	15	2				1	1	5	4	8	4	3	1
Medium	8	9				2	3	1	1	4	4	3	1
Small	7	7	1	1		1	2	2	1	5	3	3	4
%	62.5	37.5	4	4	0	15	23	31	23	65.4	34.6	70	30

Table C-1. Supervisors' evaluation of school curriculum

PRECEDING PAGE BLANK NOT FILMED

Schools by Size	Administrator knows about State Curriculum		Teachers know about State Curriculum		Plan to use State Curriculum		Adopt as is	Serve as pattern
	Yes	No	Yes	No	Yes	No		
Large	14	10	8	8	8	5	0	7
Medium	13	4	10	7	13	2	1	12
Small	11	3	8	6	11	2	1	10
Totals	38	17	26	21	32	9	2	29
%	69.1	30.9	55.3	44.7	78.0	22.0	6.5	93.5

Table C-2. Supervisors' statements concerning state curriculum

School Size	Availability of Equipment					Availability of Supplies				
	Excellent	Very Good	Good	Poor	Very Poor	Excellent	Very Good	Good	Poor	Very Poor
Large	8	4	4	1	0	9	6	2	0	0
Medium	5	6	4	1	0	5	5	6	0	0
Small	2	5	4	2	1	2	6	5	1	0
Totals	15	15	12	4	1	16	17	13	1	0
%	31.9	31.9	25.5	8.5	2.2	34.0	36.2	27.6	2.2	0.0

Table C-3. Status of equipment and supplies.

Schools by Size	Special Consultants						Schools have conducted															
	Science		Math		one for both		Science Workshops					In-service sci courses					Science fairs					
	Yes	No	Yes	No	Yes	No	59	60	61	62	63	59	60	61	62	63	59	60	61	62	63	
Large	3	11	2	12	5	11			2	2	3		1		1	1				1	9	
Medium	1	15		16		15	1		1	1					1	1				3	6	
Small		13		13		12															2	
Total	4	39	2	41	5	38	1	0	3	3	3	0	1	0	2	2	0	0	0	4	17	

Table C-4. Status of programs for the improvement of science.

Schools by Size	Single text approach		Adequacy and up-to-dateness of textbooks					Adequacy and up-to-dateness of references									
								Books					Periodicals				
	Yes	No	Excellent	Very Good	Good	Poor	Very Poor	Excellent	Very Good	Good	Poor	Very Poor	Excellent	Very Good	Good	Poor	Very Poor
Large	11	3	2	7	7	0	0	4	7	4	1	0	4	3	5	0	1
Medium	9	4	0	7	6	2	1	1	8	6	1	0	2	5	6	1	0
Small	12	1	2	3	6	2	1	1	5	6	2	0	1	5	3	4	1
Totals	32	8	4	17	19	4	2	6	20	16	4	0	7	13	14	5	2

Table C-5. Status of texts and other reference materials.

Classroom Methods	Large Schools									Medium Schools									Small Schools									Ranking			
Ranking	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	LARGE	MEDIUM	SMALL	TOTAL
Text reading and discussion	15									15	1								23									1	1	1	1
Teacher demonstrations		14	1							1	12	1	1	1						11	2							2	2	2	2
Pupil demonstrations			6	9							2	7	5							2	5	3	2			1		3	3	3	3
Pupil experiments		1	4	2	5	1	1				1	4	4	4		2					5	6	2					4	4	3	4
Field trips and excursions				1	2	1	5	2	2					2	5	1	3	2				1	1	3	3	1	2	7	6	4	8
Outdoor education						2		6	3						3	5	2	3					1	1	4	3	1	7	7	5	7
Directed observations				1	3	3	3	1	2			1	1	2	3	4	1	2				1	1	5	1	2		6	5	4	6
Research reading			4	2	3	4	1		1			3	4	4	2	1	1	1			1	2	6	1	1	1		5	3	4	5
Resource people					2	3	2	3	2						1	1	7	5						1	2	7	6	8	7	9

Table C-6. Number of schools ranking classroom methods used. Empty boxes indicate that no schools gave these rankings to these particular methods.

Visual Aids	Large Schools							Medium Schools							Small Schools							Ranking			
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	Large	Medium	Small	Total
Films	9	4	1	1				8	2	1	1	1	3		1	2	4	1	2	2		2	1	4	1
Filmstrips	2	4	4		2	2		3	7	2		2	2		5	3	2	1	1	1		4	2	1	2
Bulletin Boards	3	2	4	2	2	1		3	3	1	5	2	2		3	3	3	2	2			3	3	2	3
Live Materials			1	2	2	6	1			4	2	4	6		1	1	2	2	2	4		7	6	6	7
Dioramas				2	2	1	1		1	3	3	4	2					3	3	2	1	2	4	5	5
Charts		1	3	5	2	1	1	2	3	5	4		1		3	4	1	3	2			5	2	3	4
Models	1		1	4	5	2	1		1	3	4	6	2				1	4	3	3	1	6	5	7	6

Table C-7. Number of schools ranking visual aids used. Empty boxes indicate no schools gave these rankings to these particular visual aids.

Large Schools		Medium Schools		Small Schools	
Min/week	Schools	Min/week	Schools	Min/week	Schools
210	1	[illegible]	1	100	1
230	1	[illegible]	1	130	1
235	1	[illegible]	2	180	1
250	2	[illegible]	1	200	1
260	1	[illegible]	1	225	1
270	1	[illegible]	1	250	1
275	1	[illegible]	1	275	3
277	1	1000	1	300	1
280	1	1030	1	450	1
285	1	1250	1	900	2
290	1	1305	1	1100	1
1100	1				
1375	1				

	Large Schools	Medium Schools	Small Schools	Mean Totals
Mean	401	614	404	472
Median	275.5	344.5	275	297
Mode	275	250	275	258

Table C-6. Minutes per week per school allotted for science.

APPENDIX D

DATA COLLECTED FROM TEACHERS

School	Adapted Curriculum				Units Curriculum Irrelevant		Films for Curriculum Development	
Site	N							
	62							
	63							
	64							

School Size	Do Teacher know about State Curriculum		Do Teachers plan to use State Curriculum?		Adopt as is?	Serve as pattern?
	Yes	No	Yes	No		
Large	46	21	46	34	1	19
Medium	24	13	24	10	2	18
Small	12	9	12	4	0	12
Totals	82	43	82	48	3	49
%	65.6	34.4	63.1	36.9	5.8	94.2

Table D-2. Teachers' statements concerning state curriculum.

School Size	Departmentalization in Science		Departmentalization in other areas		Special Rooms	
	Yes	No	Yes	No	Yes	No
Large	49	3	28	5	46	3
Medium	21	3	14	4	35	2
Small	7	9	9	3	19	4
Totals	76	15	51	12	116	11
%	76.7	23.3	81.0	19.0	91.3	8.7

Table D-3. Status of departmentalization.

School Size	Availability of Equipment					Availability of Supplies				
	Excellent	Very Good	Good	Poor	Very Poor	Excellent	Very Good	Good	Poor	Very Poor
Large	13	29	22	5	0	15	24	26	4	0
Medium	8	11	16	2	0	7	13	15	2	0
Small	3	6	11	1	1	5	7	11	1	0
Totals	24	46	49	8	1	27	44	52	7	0
%	18.7	35.9	38.3	6.3	0.8	19.5	34.4	40.6	5.5	0.0

Table D-4. Status of equipment and supplies.

School size	Special formulas have contributed		Science curriculum		Science workshops		Science in-service		Science fairs		Total
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Large	16	50	11	54	20	51	5	63	14	52	67
Medium	1	34	1	34	2	33	3	32	20	16	36
Small	1	19	0	19	1	19	1	19	2	18	20
Totals	18	101	12	104	23	103	9	114	36	86	123
%	15.1	84.9	10.4	89.6	24.2	75.8	5.5	94.5	58.1	41.9	

Table D-5. Status of programs for the improvement of science.

1420		1	1420		
1320	12	1	1485		
1485	1	1	1320		
1430		1	1210		
1210	10		1430		
1430	1	1	1430		
1320	2	2	1320		
1320	2	1	1430		
1485	1	2	1430	1	1320
1430	2	1	1320	1	1320
			1320		
			1320		
		1	605	1	
		1	484	1	
		1	825	2	
		1	429	1	
		1	50	1	
		1	440	1	
		1	484	1	
		1	440	1	
		1	330	1	
		2	330	1	
		1	220	1	
			440		
			330		
Number Colonies	Medium Colonies		Large Colonies		

School Size	Single Text		Adequacy and up-to-dateness of texts					Adequacy and up-to-dateness of reference books				
	Yes	No	E	VG	G	P	VP	E	VG	G	P	VP
Large	35	3	13	25	13	4	2	12	26	20	10	0
Medium	24	3	9	11	15	6	7	4	12	11	4	0
Small	20	1	4	9	6	3	0	4	10	4	4	0
Totals	79	7	22	45	44	13	9	20	54	35	18	0
%	91.8	8.2	17.3	35.4	34.6	10.3	2.4	15.8	42.5	27.5	14.2	0.0

Table D-7. Status of texts and reference books. In the horizontal column heading, E represents Excellent, VG represents Very Good, G represents Good, P represents Poor, and VP represents Very Poor.

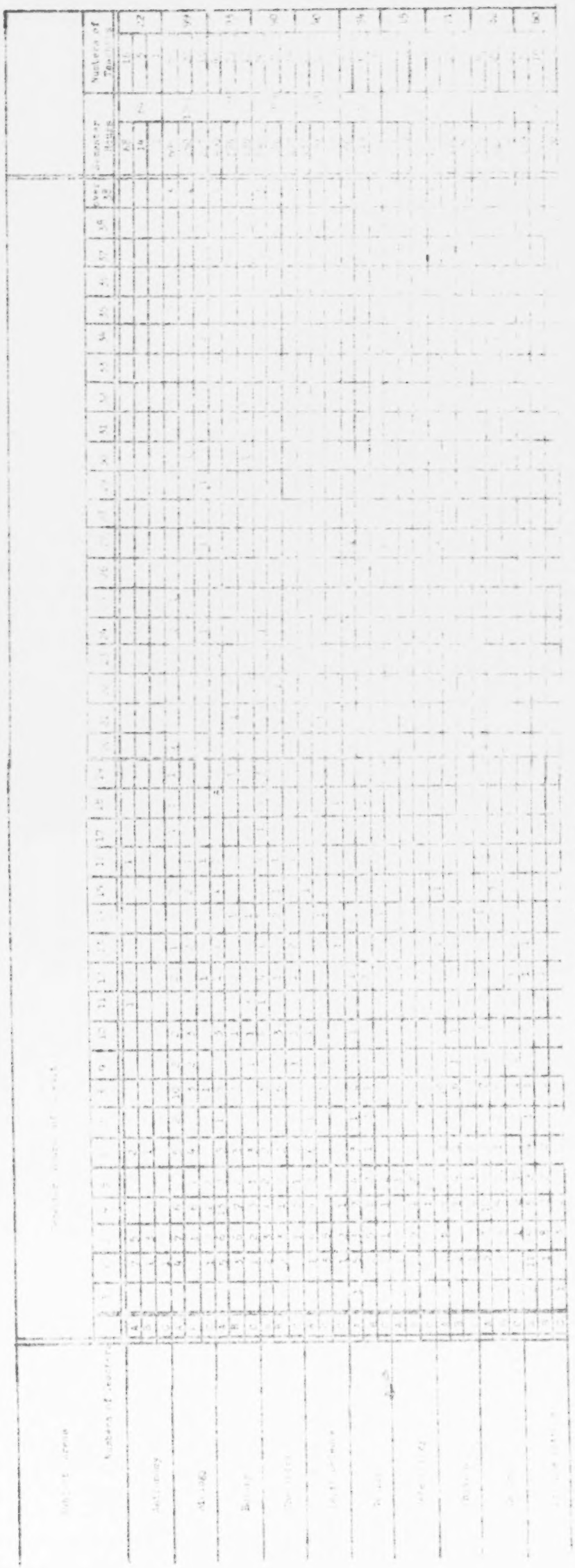
Classroom Methods	Large Schools											Medium Schools											Small Schools											Ranking			
	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11	LARGE	Medium	SMALL	mean
[illegible]																							2	3													
[illegible]						1								1	2								1	4													
[illegible]																2	5	1	1																		
[illegible]																	

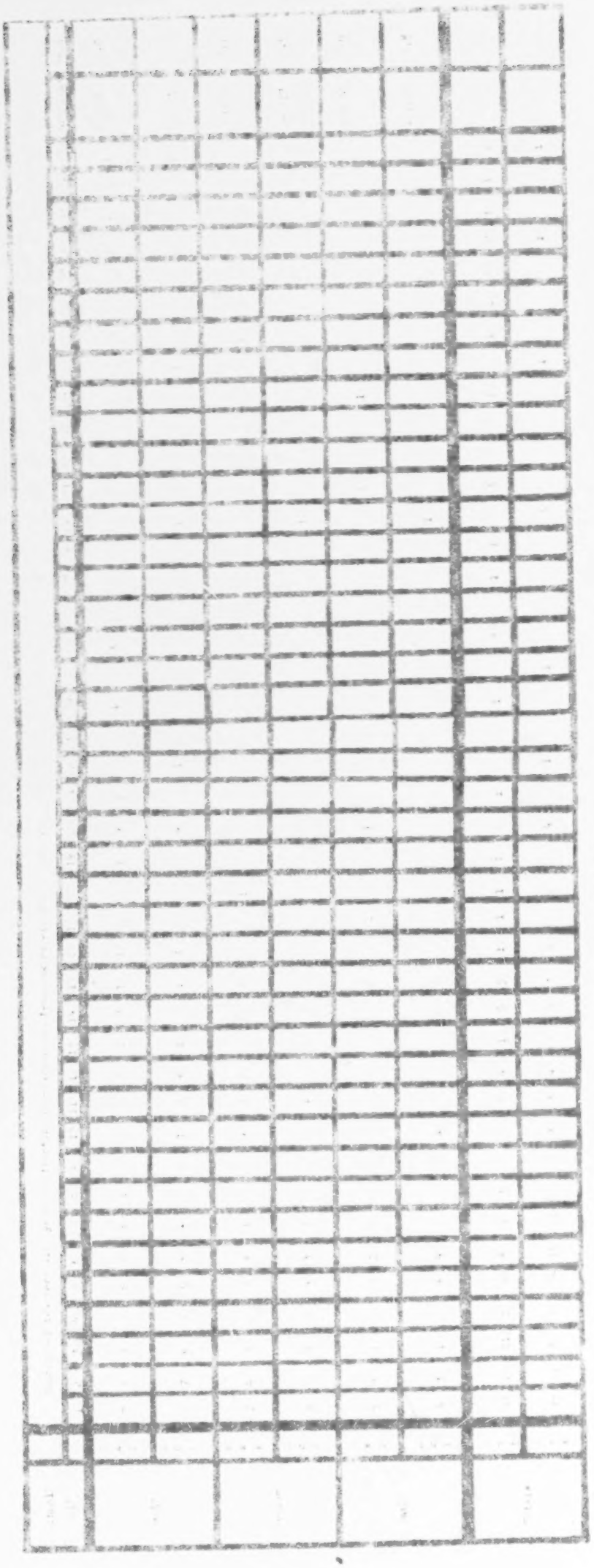
Visual Aids	Large Schools							Medium Schools							Small Schools							Ranking			
ranking	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	L	M	S	T
Films																									
Filmstrips																									
Bulletin boards																									
Textbooks																									
Pictures																									
Charts																									
Models																									

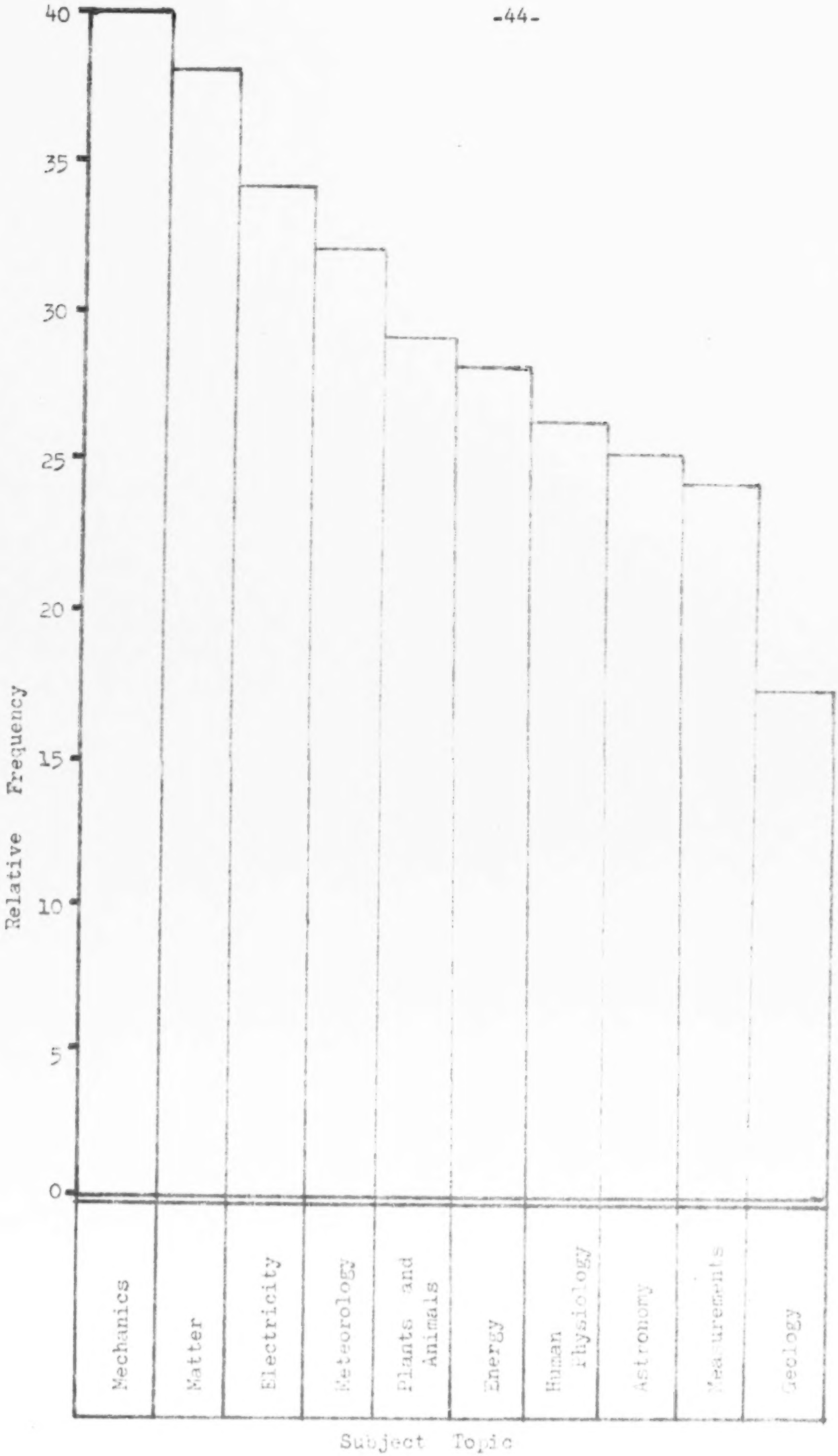
Table B-9. Number of schools ranking visual aids used. Empty boxes indicate no schools gave these rankings to these particular visual aids.

School Size \ Degree	B.A.	B.S.	M.A.	M.S.	Ed.D.
Large	29	24	17	7	3
Medium	12	14	4	1	0
Small	2	1	1	0	1
Totals	43	51	22	8	4

Table D-10. Numbers of teachers holding particular degrees.







Graph Relative frequency of major subject topic emphasis in junior high school science.